DOCUMENT RESUME

ED 412 960 IR 056 604

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TITLE We've Done Research, Now What? Multimedia Authoring as a Report Tool.
PUB DATE 1997-00-00
NOTE 9p.; In: Information Rich but Knowledge Poor? Emerging Issues for Schools and Libraries Worldwide. Research and Professional Papers Presented at the Annual Conference of the International Association of School Librarianship Held in Conjunction with the Association for Teacher-Librarianship in Canada (26th, Vancouver, British Columbia, Canada, July 6-11, 1997); see IR 056 586.
PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Authoring Aids (Programming); Computer Uses in Education; Educational Innovation; Elementary Secondary Education; Foreign Countries; Hypermedia; *Information Seeking; *Information Skills; Information Sources; Information Utilization; *Multimedia Instruction; *Multimedia Materials; Problem Solving; School Libraries; Technological Advancement; User Needs (Information)
IDENTIFIERS *Teacher Librarians

ABSTRACT

The professional literature and research conclude that new technologies produce either similar or superior results to conventional classroom instruction, arguably because technology has positive effects on students' attitudes toward learning and gives students more control over their learning. Teacher- librarians, as information specialists, facilitate the student's gathering and understanding of information from all available sources, including electronic. The use of multimedia authoring as a forum for reporting follows logically. Teacher-librarians, as technology coordinators, can facilitate the many aspects of a multimedia project--working with various-sized groups, deciding on the best use of resources, planning with classroom teachers, timelines, and handling challenges. Multimedia authoring extends the reading, writing, and problem-solving skills of the students beyond the basic abilities required in the curriculum, while having fun. It provides a hands-on means of interacting with technology at a higher skills level and learning about this valuable resource through a purposeful activity. Multimedia authoring completes the learning circle: students use computers to seek information, then learn how to create multimedia in order to author a research report that will become a source of information for other students. Teacher-librarians need to seize the opportunity to play a vital role in the introduction of the new technologies in schools by making themselves indispensable in sharing their unique skills. (Contains 12 references.) (SWC)

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ED 412 960

WE'VE DONE RESEARCH, NOW WHAT? MULTIMEDIA AUTHORING AS A REPORT TOOL

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ABSTRACT

The professional literature and research conclude that new technologies produce either similar or superior results to conventional classroom instruction, arguably because technology has positive effects on students' attitudes towards learning and gives students more control over their learning.

Teacher-librarians, as information specialists, facilitate the student's gathering and understanding of information from all available sources, including electronic. The use of multimedia authoring as a forum for reporting follows logically.

Teacher-librarians, as technology coordinators, can facilitate the many aspects of a multimedia project--working with various-sized groups, deciding on the best use of resources, planning with classroom teachers, timelines, and handling challenges.

IMPACT OF THE NEW TECHNOLOGIES IN EDUCATION

> Students need to be able to read, think and write as they study across subjects...it is essential for students to be able to do these skills together and not only as discrete skills, so that they can apply their abilities to real-life situations in their studies in school...That is why the emphasis in the use of technology in schools [in River East School Division] is on the application of reading (which is called research in the upper grades), writing and thinking." (RESD, 1994)

Expectations of learning outcomes for the new technologies are high in the educational community. Rose and Meyer (1994) believe that New technologies will extend our capacities to communicate effectively—to persuade, inform, entertain, remember, teach, create art and inspire." Conversely, in their extensive joint research, Reginald Gregoire inc., Bracewell and Laferriere (1996) found that: New technologies have the power to stimulate the development of intellectual skills such as reasoning and problem solving ability, learning how to learn, and creativity."

However, in order for technology to leave an impact, it must become an integral part of the curriculum (Eisenberg & Johnson, 1996). Technical skills cannot be taught in isolation and be expected to make a significant difference in improving the learning of students. Technology has to be integrated with the subject at hand—it must become a tool through which students learn rather than the subject students are learning.

Sun Valley Elementary School (River East School Division #9, Winnipeg, Manitoba, Canada) is an example of a school which has embraced and integrated technology in its curriculum with excellent results. For the past five years, the focus has been on the use of technology to develop literacy skills:
e of technology to develop literacy skills:

- to have every student at grade level or above in reading and writing;
- to challenge all students to become independent, reflective learners;
- to support and encourage all students to read and write to their potential;

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• to support teachers as they integrate the use of computers into all areas of their teaching.

These goals were tested by Dr. Bev Zakaluk of the University of Manitoba, using the premise: Would the development and use of multimedia for presentations and Internet for communication by elementary students improve reading?" She studied Sun Valley Elementary School students at grade 2 and 5 levels in 1994 and compared them with two control groups from other schools. After five months of study, she found a dramatic improvement in performance. For example, only two out of 100 grade 5 students wrote at grade level or lower, but several wrote at a high school level!

Those results were realized because all classroom teachers, along with the teacher-librarian and resource teachers, are focused on achieving the intended literacy outcomes. Specifically, at the primary level, the emphasis is in the use of computers and CD-ROMs to support and motivate children as they learn how to read and write. Commercial and school-produced Talking Books" support the teaching of reading, among other things. All primary classrooms are equipped with a computer and CD-ROM player.

At the upper elementary level, computer skills are never taught as a subject. However, to facilitate an effective use of computers, students learn keyboarding and basic word processing. Later, advanced skills are taught in the context of the subject the students are learning, or within the research they are doing, on a need-to-know basis. All students are expected to learn those skills. Students compose stories, formal reports, biographies and science reports among others.

WHY USE MULTIMEDIA?

At the upper elementary level, multimedia is used as a form of reporting to enhance student writings. The outcomes observed at Sun Valley Elementary are supported by Heidmann, Waldman and Moretti: "Multimedia technologies enable the creation of environments in which constructivist learning can take place." (1996, p. 301)

he creation process involved in using multimedia authoring as a reporting tool gives students the opportunity to illustrate or explain difficult ideas or concepts in a variety of ways, through a medium flexible and varied enough that it will allow them to express themselves according to their learning styles, interests and personality.

Creating for an audience elevates the multimedia authoring from an activity of computer skills training to an activity of higher level thinking, where strategies and procedures take precedence. Indeed the technical skills developed in multimedia become incidental to the message the author is imparting through the multimedia creation and the solving of problems s/he might encounter in the process.

Thus, it is not so important to learn how to make a QuickTime video, for example, as it is to make it effective so that the audience will understand the meaning of the author's message. The undeniable benefit of having students as authors is that they speak the same language" as their audience. They are likely to have encountered similar challenges in their own learning and therefore should be able to communicate on an equal level with them.

The challenge of the creator, besides ensuring that the message gets across to the reader, is that s/he has to make the multimedia presentation interesting enough that the reader wants to revisit it to gather more information. As well, the text has to be at a level with which the reader can easily interact. And finally, the creation should be a balanced blend of information and visual interest to encourage the reader to revisit it, not so much to try the bells and whistles as to learn from the contents.

Multimedia authoring as a form of reporting is only one of the uses of this diverse technology. Multimedia authoring can serve other worthwhile purposes as discussed below. The versatile ingenious teacher will see the possibilities as s/he becomes familiar with this technology, with the help and guidance of a mentor such as the teacher-librarian.

TEACHER-LIBRARIANS AND TECHNOLOGY

Teacher-librarians are poised to have an impact on technology. The library is the information center of the school and the teacher-librarian its information specialist, including broker in information, facilitator

of research, generator of ideas, purveyor of resources, instigator in the search for information. It is a short step from there to chief planner and director in the drive for creation of information resources in the form of multimedia.

Many jurisdictions have embraced technology as a separate entity, delegating its teaching to newly created positions held by technology specialists." This is an unfortunate trend, because teacher-librarians have long had experience in integrating information skills into cooperatively planned and taught units of study. But more importantly, the principal benefit of technology is undeniably that it is an up-to-date source of information, making it the realm of teacher-librarians.

This trend is also unnecessary if technology activities are priorized. There is no need for a technology specialist if the computers are used for drill and practice activities such as for math or spelling games. Since these are no different from activities available in textbooks, a classroom teacher could easily supervise them while a computer technician was available in case of computer breakdown.

However, using technology for creative work such as researching information, and composing and creating multimedia are all higher level thinking skills requiring the guidance of someone like a teacher-librarian, who was most likely involved in the planning stages of the research which preceded those activities.

This opinion is supported by Brown (1990) who suggests that: [Teacher]-librarians assist teachers and students to search out their information needs, critically evaluate the materials they locate, and use technological means to synthesize their findings into new knowledge." It is her belief, as well as that of Eisenberg and Johnson (1996) and Pritchard (1996) that teacher-librarians should not only become proficient at using the new technologies in their role as information experts, but also become leaders in the field, instructing their colleagues, mentoring them in their learning, and guiding them through the electronic sources of information.

In the all-encompassing role as information specialist, the teacher-librarian plays an essential part in assisting students to access, analyze, and organize the data they will find in their searches. The new technologies have the power to stimulate the search for more extensive information on a subject, a more satisfying solution to a problem, and more generally, a greater number of relationships among various pieces of knowledge or data." (Reginald Gregoire inc, Bracewell & Laferriere, 1996). In the dual role as resource person for technology, the teacher-librarian will also provide on-going technical support while helping and guiding students to write their research report in the form of a multimedia document.

Multimedia authoring thus completes the learning circle: students use computers to seek information, then learn how to create multimedia in order to author a research report that will become a source of information for other students.

SETTING UP A MULTIMEDIA REPORT

In November 1996, Sun Valley Elementary's teacher-librarian pressed a CD-ROM for in-house use, containing 10 of the multimedia projects produced by students and teachers over the previous three years. Each project contains student-authored text, student-drawn illustrations, and one or more of: pop-up information windows, photographs, sound (text read-along and/or sound effects) and QuickTime video.

Practical Considerations

Choosing a topic. With a little imagination, any topic can be adapted to a multimedia project. Teachers will often take a unit they are studying in class and use a multimedia format as a reporting tool. "The Metis" was an interesting visual way to represent life in Manitoba in the late 1800s and "Our Solar System" gave an overview of the planets and other stellar bodies.

A grade 6 class studying notable Canadians of the 50s-60s-70s recently created electronic biographical cards" using information and photographs gathered from the Internet to complement that found in print materials.

Appropriate resources are almost non existent for second language studies. French Immersion teachers have long been accustomed to creating their own. As part of their Basic French studies, grade 6 students created simple thematic books which the French Immersion students use to practice reading.

Organizing around your resources. At Sun Valley Elementary, all grade 6 students experience multimedia. This is made easier with the number of computers available at the school. However, it is still possible, if only more time-consuming, for an inventive and flexible teacher to create a project with one computer, which has been done successfully in the past. Setting up the classroom in learning centers, where the computer becomes an activity station is the most workable solution. Some of the possibilities for a project with one computer and 28 students are:

- Enlist the teacher-librarian / technology person to train a small group of students who in turn become mentors for the others in the class. If the project is the result of a research unit cooperatively planned and taught, then the teacher-librarian would be involved in helping the students develop the multimedia;
- Create three small projects setting up teams of 9-10 students each, where each student creates one page of the multimedia;
- Pair the students and have each pair create one page—for one large 14-page project or two 7-page projects.

Timeline/Planning with the whole class. Multimedia projects involving a group of students working cooperatively to create one product require a lot of planning to ensure success because students have to discuss, negotiate and agree on how they will proceed.

Simple thematic books for an intended primary audience are easier to plan and execute and faster to produce. A grade 6 group of 24 students, working in pairs, planned a 12-page book on "*L'hiver*" (Winter) as a Basic French report, the following way:

- as a whole class they brainstormed with the teacher-librarian for fun winter activities;
- they sorted them into four areas: hillside, cabin, ice rink, the woods;
- they chose the three most suitable activities for each area;
- each pair of students picked an activity;
- the three pairs in each area met to discuss common elements within each area in order to draw illustrations that were fairly consistent ;
- the short text was edited with the help of a francophone parent volunteer.

When working on "*Les animaux*" (The Animals) for Basic French, each student in another grade 6 group picked one animal. With the teacher, they had previously agreed on a repetitive format for the text, in the form of This is a (cat, dog). The (cat, dog) is (white, small) It goes (sound)." They worked at one computer, taking turns designing their page and adding the text. When all the art work was finished, they added the sound buttons for the read-along text.

Storyline "talking books"are much more demanding in time and effort. A group of five grade 6 students used the information they gathered for a social studies project and integrated it in a fictional story with digitized photographs as well as drawn pictures to create a 50-page major multimedia project: "*A Week to Remember: A Travelogue*"

- Students brainstormed for the kinds of activities their characters would do and places they would visit during the week.
- Each student picked the day that s/he would write about. The first author started on Monday and composed a story based on the activities previously agreed upon for that day. Then the Tuesday author wrote about the Tuesday adventures, taking into account what had already happened on Monday, as well as some incidents the Monday author included that would impact on the rest of the week. The Friday author predictably had a challenging task.
- The text was cut in segments that would each have their own illustrations.
- The students assigned each other the pictures. They had to develop common parameters for the characters, such as colour of hair, glasses, etc. Although they worked on illustrations on their own, they frequently viewed each other's drawings to ensure continuity.

• When the text and illustrations were completed, they included hot buttons" and sound. In this case, the whole story is read by the authors each taking the part of one of the characters. The reader can read along with the text by activating the sound button on each page.

Storyline multimedia are the most challenging to produce because the common threads that run through the story need to be respected. Cohesion and consistency are very important factors. Such projects give the students a good sense of what authors and illustrators go through in terms of planning and ensuring accuracy when writing a book. Such a project can be a year-long affair, especially if the story is written on an extra-curricular basis rather than for a research report.

A research report proper falls between a storyline book and a simple single-topic thematic book in terms of planning. Some topics lend themselves to writing information pages independent from one another about one subject, such as the solar system or mammals of Canada. Others could present a chronological development, for example, the life-cycle of the frog or the voyages of Columbus. In each case, however, searching tools such as a table of contents or an index should be built in to facilitate finding the information contained within the report.

Storyboards. When they produced "The Field Trip," an interactive choose-your-own-adventure type of story with 16 possible lines of action, a group of students used another planning technique—the storyboard. (see diagram on the following page)

Students and teacher planned on paper, using a web-like diagram, with cells to describe each page of the planned book and arrows to illustrate the relationship between the cells. These arrows would later facilitate inserting the links or hot buttons" which act as page turners.

Producing The Final Project

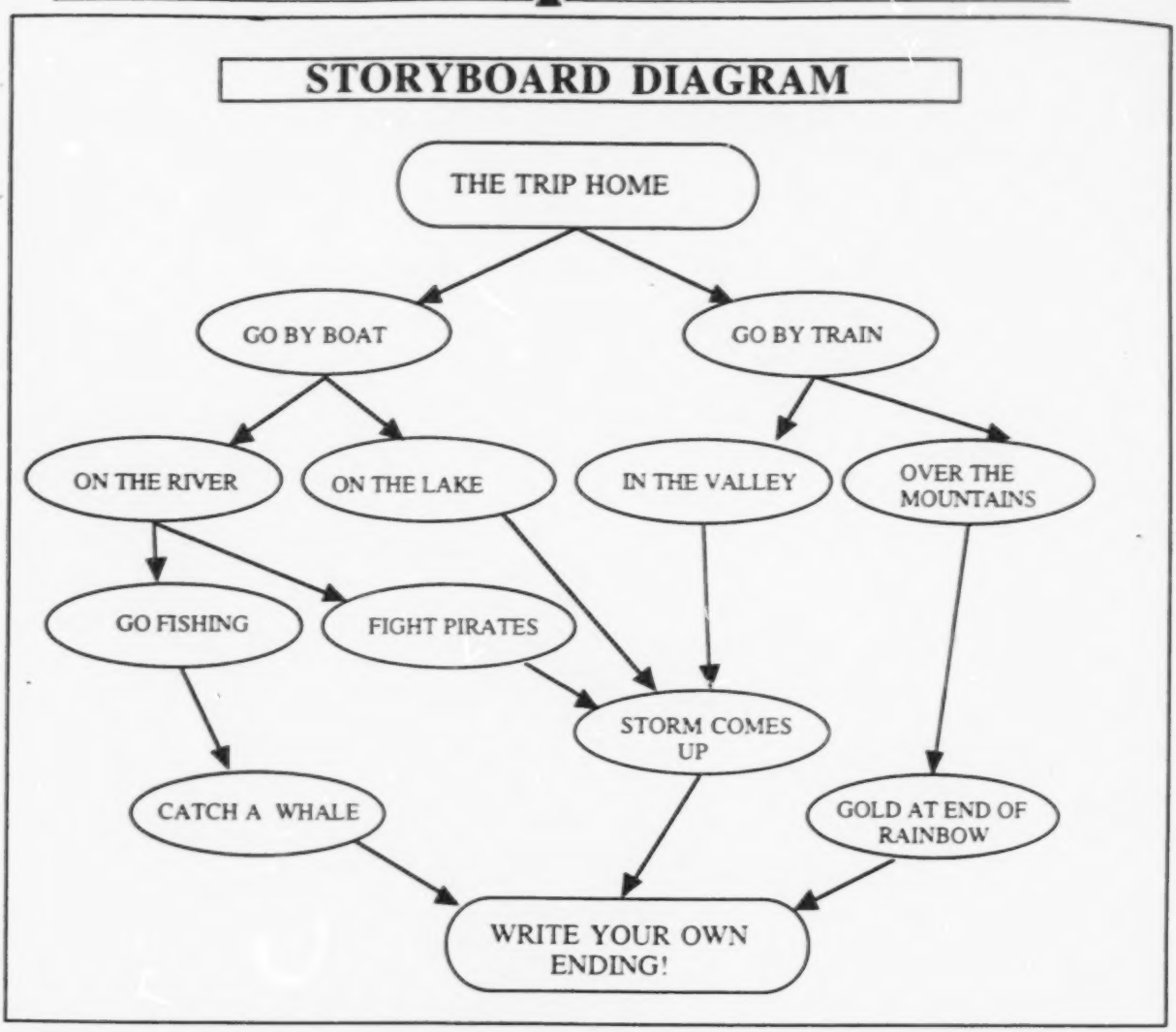
Format. The title page should provide similar information as found in print materials—the title of the "book," the name(s) of the student(s), the name of the classroom teacher, the name of the producing teacher if it is different, the grade level of the students, the date of copyright and other pertinent information if needed.

For research projects, a table of contents or index should be included, listing in alphabetical order the topics found within the talking book and allowing users to reach a specific topic with links made directly from this page.

Command bars or control bars are an asset in simplifying the final product. A pre-designed bar placed at the bottom of the page, contains such commands as Quit (taking the user back to page 1), Contents or Main Menu (if suitable, taking the user back to this page), back-pointing arrow and a forward-pointing arrow. This bar should be present on the page before the student creates the illustration.

Recording. Once the pages are ready, the sound can be recorded and the links between pages can be activated. Before recording, students should read the text through a few times for intonation, enunciation and proper rhythm. In the case of conversation, the students sometimes find that the text does not read fluidly and they might edit it to make it sound more natural. Text read for a talking book intended for reading support in the primary grades should be read deliberately and slowly. Such recordings should be no more than 20 seconds in length. If the text is longer, make a second recording for the rest of the text. It is easier for the reader to have short recordings, especially when the intent of the text is to provide read-along practice for young readers.

While a quiet room is a bonus when recording, some groups have recorded successfully while a class was in progress, such as during quiet reading time or an art activity. The whole class can be asked to stand still for the few seconds that the recording takes.



Some Challenges Along the Way. Multimedia projects can challenge the students by presenting them with issues that they had not previously considered. When writing a story which they illustrate, they have to be mindful that the illustration must support the text. This means that for any page where a character appears, s/he must wear the same clothing, for example, and have the same hair style.

In designing a page, the student must ensure that there is enough room to insert the text, that is, balance the length of text and the size of the illustrations. In this instance, a storyboard is helpful in planning.

Of course, the information must be totally accurate. A group of students can be designated to verify the information in reference books. An expert is a great asset in pointing out inaccuracies. For example, in "The Metis," an expert pointed out which colours would have been used in the late 1800s to dye clothing as well as the proper way to hit a bison when shooting it. Students edited their text and illustration accordingly.

CONCLUSION

Multimedia authoring extends the reading, writing and problem-solving skills of the students beyond the basic abilities required in the curriculum, while having fun. It provides a hands-on means of interacting with technology at a higher skills level and learning about this valuable resource through a purposeful activity. Finally, it makes students feel worthwhile about their accomplishments.

While students will readily embrace these new technologies, teachers will need to hone their own technology skills in order to be effective in their integration of the new technologies in their teaching.

Teacher-librarians need to seize the opportunity to play a vital role in the introduction of the new technologies in schools by making themselves indispensable in sharing their unique skills.

APPENDIX

Findings At Sun Valley Elementary

- Students write more in general. For students who still have difficulty with pencil and paper or motor coordination, the idea of working on the computer can be a release.
- Students do more revisions than they would do with pencil and paper. It is much easier and less painful to edit since computer deleting does not leave blanks on the screen the way pencil does on paper where the words used to be. Moving whole paragraphs around is a cinch with cut and paste.
- Students produce much better illustrations. Although they do not have the choice of the medium, whether ink, pastels or paint and it takes dexterity to achieve with a mouse the details that they might achieve with a pencil, editing is so much easier. Many students would set aside an illustration if the house did not look the way they planned, the tree was in the wrong location, or the boat was too big for the lake. The computer house can be redrawn without leaving eraser or pencil marks on the paper, or ripping the paper. The tree can be moved to another location. The boat can be downsized.
- Students' computer skills are improving. The overall quality of the projects students are producing has dramatically improved. They are visually more appealing, and include more extras" such as photographs and enhanced sound effects. Projects previously completed seem to act at gauges to measure new endeavours against, and to surpass.
- Student's problem-solving skills are improving. As they strive to enhance their creations, they typically face hurdles. They learn to think ahead about the consequences of a move, or about how to best achieve what they have in mind. They have to consider what is the most appropriate tool they can use in the tool palette to do what they intend.
- Student's cooperative planning skills are improving. They learn to plan within a group, to respect the opinion of others, to bounce ideas back and forth, to negotiate and to function as part of a collective with a common goal.
- Students feel great about themselves. They create something the rest of the school talks about, their work is used by students in theirs or other classes. They are being looked up to by students who know them or who know that when they reach that grade, they will also be creating some wonderful multimedia project.

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